

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.

21954

Se. No. 10/035,811

SUB
SPEC
#3/A
NE.
AW
12-18-03

DESCRIPTION

The present invention relates to a pipe fitting for inside coated pipes and to a method for its installation.

In particular, the present invention relates to pipe fittings for piping chemical, acid, abrasive, wearing products, etc.

The pipes of the above type currently comprise an inside layer made of rubber, plastic, thermoplastic rubber, or other material adapted to resist to the product to be piped.

An intermediate stiffening layer is integral to it, and it is adapted to impart vacuum and/or pressure resistance to the pipe, realised through metal (wires, strings, strands) or textile (polyester, polyamide, aramide, rayon or other) plaits or spirals.

Finally, on the intermediate layer there is applied a covering layer adapted to protect the pipe from the action of external (atmospheric, chemical, mechanical wearing, etc.) agents, made of rubber, plastic, thermoplastic rubber, polyurethane, fabric, or other.

At the ends of the pipes there are applied pipe fittings allowing the connection of more pipes to one another.

In traditional embodiments, such pipes are made integral to the pipes during production, and they cannot be separated from the finished pipe; in practice, pipe fittings and pipes form a

single piece.

However, traditional pipes cannot be produced in standard sizes to be stored and successively cut according to the buyers' requirements, since pipe fittings must in any case be applied to the ends of the pipes during production.

Thus, in practice, traditional pipes are produced on request, and they are sized according to the sizes required by the buyers.

Thus, the technical object of the present invention is that of eliminating the above technical disadvantages of the prior art by realising a pipe fitting for inside coated pipes which could be connected to an end of the finished pipe of the indicated type when the same pipe is installed, that is, even at the building yard.

Within the scope of this technical object, a purpose of the invention is that of realising a pipe fitting which should allow producing standard length pipes which could be stored and successively cut according to the buyers' requirements.

Another purpose of the invention is that of realising a pipe fitting which should guarantee a resistance to the piped product similar to that guaranteed by the pipes.

A further purpose of the invention is that of indicating a method for installing the pipe fittings, so that may be installed on the finished pipes in a simple and quick manner.

The technical object, as well as this and other purposes,

according to the present invention, are achieved by realising a pipe fitting for pipes exhibiting a coating having a high mechanical and/or chemical resistance, comprising a first tubular portion adapted to be connected to said pipe, to which there is connected a second portion, adapted to the connection with another pipe fitting, characterised in that at least said first tubular portion exhibits an inside coating made of a material having a high mechanical and/or chemical resistance.

The pipe fittings according to the invention are suitably installed through a method for installing a pipe fitting for inside coated pipes, characterised in that it comprises a first step wherein at least one inside layer of said pipes, at at least one of end of said pipe, is removed to obtain a housing, and a second step wherein a tubular portion of said pipe fitting is introduced into said housing.

Moreover, further features of the present invention are defined in the following claims.

Further features and advantages of the invention will appear more clearly from the description of a preferred but not exclusive embodiment of the pipe fitting for inside coated pipes and of the method for its installation, according to the finding, illustrated by way of a non-limiting example in the attached drawings. In such drawings:

- Figure 1 shows a portion of a longitudinal section of a pipe fitting according to the finding, connected to an inside

coated pipe, provided with a flanged connection portion;

- Figure 2 shows a pipe fitting according to the finding in a step of assembly on a pipe;

- Figure 3 shows a portion of a longitudinal section of the pipe fitting according to the finding connected to an inside coated pipe, provided with a threaded connection portion;

- Figure 4 shows a portion of a longitudinal section of a second embodiment of the pipe fitting according to the finding, connected to an inside coated pipe; and

- Figure 5 shows a portion of a longitudinal section of a third embodiment of the pipe fitting according to the finding, connected to an inside coated pipe.

With reference to the above figures, there is shown a pipe fitting for inside coated pipes, collectively indicated with reference numeral 1.

Pipe fitting 1 is adapted to connect to one another pipes 2, of the type comprising an outside layer 3 made of rubber, plastic, thermoplastic rubber, superimposed to a layer 4 made of textile (polyester, polyamide, aramide, rayon or other) or metal (wires, strings, strands) plaits or spirals.

In turn, layer 4 is superimposed to an inside rubber layer 5.

The rubber of layer 5 is adapted to resist to chemical, acid, abrasive, wearing products, and in general it exhibits a high mechanical and/or chemical resistance; the rubber of layer

3 is of the same type as the rubber of layer 5, even though in other embodiments it is of a different type.

Pipe fitting 1 comprises a first tubular portion 6, which is adapted to be connected into a housing 7 inside pipe 2.

A second portion 8 protrudes from the first tubular portion 6, which is adapted to be connected to another portion 8 of another pipe fitting 1.

In the example shown, portion 8 consists of a flange provided with through holes (not shown) for inserting connection screws. However, in other embodiments, portion 8 is realised in a different manner.

Tubular portion 6 exhibits an inside coating 9 made of a material having a high mechanical and/or chemical resistance.

In a preferred embodiment, the material of coating 9 is the same as that of the inside layer 5 of pipes 2.

Moreover, in the example shown, also the second portion 8 exhibits a coating 10 made of the same material with high mechanical and/or chemical resistance as coating 9.

The first tubular portion 6 exhibits a plurality of elements 11 protruding from its outside surface.

Elements 11 engage into layer 5 thus favouring the connection of pipe fitting 1 to pipe 2.

Moreover, pipe fitting 1 also comprises a clamping member 12 of the tubular portion 6 of pipe fitting 1 to pipe 2.

The clamping member 12 exhibits a tubular body provided with

inside protruding elements 13 which, by engaging in the coating layer 3, favour its connection to pipe 2.

Moreover, in a preferred embodiment, the clamping member 12 exhibits connection means to the first tubular portion 6.

Such connection means comprises an annular portion 14 extending from the tubular body of member 12, and exhibits the free edge inserted into a groove 15 of the tubular portion 6.

In a different embodiment, the clamping member 12 comprises clips or other devices.

Moreover, in housing 7, between the tubular portion 6 of pipe fitting 1 and the inside layer 5 of pipe 2, there is inserted a sealing element 16 which guarantees the continuity of the coating between the same pipe 2 and pipe fitting 1.

The sealing element 16 is realised, for example, through putty, self-vulcanising rubbers, rubbers to be vulcanised or other dopes.

The pipe fitting for inside coated pipes is installed according to the following method.

Pipe 2 is first cut to size according to the needs.

Afterwards, a portion of the inside layer 5 of pipes 2 is removed at the end to which pipe fitting 1 must be connected, so as to obtain housing 7.

Such operation is carried out, for example, through rasping or other known method.

In a second step, the tubular portion 6 of pipe fitting 1 is

inserted into housing 7 and it is locked therein, also thanks to elements 1 that engage into layer 5, or though chemical clamping by means of an adhesive, or other.

In a third step, the clamping member 12 is inserted on the coating layer 3 of pipe 2.

In the example shown in the figures, the insertion of the clamping member 12 on pipe 2 is substantially concurrent to the insertion of portion 6 into the same pipe 2.

On the other hand, in the case of clamping members consisting of clips, the clips are applied after having introduced portion 6 of pipe fitting 1 into pipe 2.

The dope that realises element 16 can be applied during the steps of assembly of the pipe fitting on the pipe.

Figures from 3 to 5 show further examples of embodiment of pipe fitting 1 according to the finding, wherein equal reference numerals indicated equal or similar elements.

Figure 3 shows pipe fitting 1 where the second portion 8 is threaded.

In the example there is shown a male threading, but it is evident that pipe fitting 1 can exhibit a female threading.

Figure 4 shows another example of a pipe fitting 1 wherein the connection between the clamping member 12 and layer 3 of pipe 2 is realised through an adhesive layer 17, whereas the connection between portion 6 and layer 5 of pipe 2 is realised by forcing the same portion 6 into housing 6, optionally by

interposing an adhesive.

Such embodiment of pipe fitting 1 is adapted, for example, for low-pressure pipes.

Figure 5 shows a further example of a pipe fitting 1 wherein the connection between the clamping member 12 and layer 3 of pipe 2 is realised through an adhesive layer 17, whereas the connection between portion 5 and layer 5 of pipe 2 is realised through elements 11 protruding from the outside surface of the tubular portion 6.

In practice, it has been proved that the pipe fitting for inside coated pipes and the method for its installation according to the invention are particularly advantageous since they allow producing standard size pipes that can be stored and successively cut in any position. The pipe fittings according to the finding can be connected to the ends of such pipes in a simple and quick manner and moreover, the connection can also be carried out at the building yard.

The pipe fitting for inside coated pipes and the method for its installation thus conceived can be subject to several changes and variants, all falling within the scope of the inventive idea; moreover, all details can be replaced with technically equivalent elements.

In practice the materials used, as well as the sizes, can be of any type according to the requirements and to the prior art.

Claims

1. Pipe fitting (1) for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, said pipe fitting (1) comprising a first tubular portion (6) adapted to be connected to said pipe (2), to which there is connected a second portion (8), adapted to the connection with another pipe fitting (1), characterised in that at least said first tubular portion (6) exhibits an inside coating (9) made of a material having a high mechanical and/or chemical resistance.
2. Pipe fitting (1) according to claim 1, characterised in that also said second portion (8) exhibits a coating (10) made of said material having a high mechanical and/or chemical resistance.
3. Pipe fitting (1) according to one or more of the previous claims, characterised in that said first tubular portion (6) exhibits elements (11) protruding from its outside surface, adapted to favour the connection of said pipe fitting (1) to said pipe (1).
4. Pipe fitting (1) according to one or more of the previous claims, characterised in that it comprises at least one clamping member (12) of said first tubular portion (6) to said pipe (2).
5. Pipe fitting (1) according to one or more of the previous claims, characterised in that said clamping member (12) exhibits a tubular body.
6. Pipe fitting (1) according to one or more of the previous

claims, characterised in that said tubular body is provided with inside protruding elements (13) adapted to favour the connection of said clamping member (12) to said pipe (2).

7. Pipe fitting (1) according to one or more of the previous claims, characterised in that said clamping member (12) exhibits connection means (14, 15) to at least said first tubular portion (6) of said pipe fitting (1).

8. Pipe fitting (1) according to one or more of the previous claims, characterised in that said connection means (14, 15) comprises an annular portion (14) extending from said tubular body of said clamping member (12), said annular portion (14) exhibiting a free edge inserted into a groove (15) of said first tubular portion (6) of said pipe fitting (1).

9. Pipe fitting (1) according to one or more of the previous claims, characterised in that at least said first tubular portion (6) is inserted into a pipe (2) which exhibits an inside layer (5) made of a material resistant to chemical and/or acid and/or abrasive and/or wearing products.

10. Pipe fitting (1) according to claim 9, characterised in that said inside coating (9) of said first tubular portion (6) is made of the same material as said inside layer (5) of said pipe (2).

11. Pipe fitting (1) according to claim 9 or 10, characterised in that it comprises a sealing element (16) at least between said first tubular portion (6) of said pipe

fitting (1) and said inside layer (5) of said pipe (2).

12. Pipe fitting (1) according to one or more of claims from 9 to 11, characterised in that it comprises an adhesive layer (17) at least between said clamping member (12) and said pipe (2).

13. Method for installing a pipe fitting (1) for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, characterised in that it comprises a first step wherein at least one end portion of said inside layer (5) of said pipes (2) is removed so as to obtain a housing (7) of a tubular portion (6) of said pipe fitting (1), also exhibiting a high mechanical and/or chemical resistance, and a second step wherein said first tubular portion (6) of said pipe fitting (1) is locked into said housing (7).

14. Method according to claim 13, characterised in that it comprises a third step wherein a clamping member (12) is connected to at least said pipe (2).

15. Pipe fitting (1) for pipes (2) exhibiting a coating (5) having a high mechanical and/or chemical resistance, and method for its installation, as described and claimed.
